Protein Synthesis Game

## The STEPS! Just a reminder and more details ☺

* Step 1: RNA polymerase attaches to the DNA strand
* Step 2: RNA polymerase unzips the DNA strand
* Step 3: RNA polymerase adds complimentary nucleotides to one side of the DNA strand
* Step 4: the newly created mRNA strand detaches from the DNA strand and leaves the nucleus, DNA strand winds back up
* Step 5: mRNA strand travels to a ribosome in the cytoplasm
* Step 6: Ribosome reads the mRNA strand as codons (3 bases at a time)
* Step 7: tRNA brings amino acids to ribosomes
* Step 8: amino acids link up to create a protein

## Directions:

1. The player that is the YOUNGEST should start the game.
2. Roll the dice to see what happens. Use the table to determine your next move. You MUST complete protein synthesis in the proper order. **IF** you roll a number that is not the next step, it is the next person’s turn. **THINK –** what number will start the game?! Then what number will you look for?
3. Continue on until one person has made a protein!

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| Dice # | Step of Protein Synthesis | Your action…. |
| 2 | mRNA strand travels to a ribosome in the cytoplasm | Write your mRNA strand going through the ribosome. Label it #5. |
| 3 | tRNA brings amino acid to ribosome | Draw a tRNA molecule to the right of the ribosome. Write in the amino acid for the first TWO mRNA codons. Label it #6 |
| 4 | RNA polymerase attaches to the DNA strand | Inside the nucleus, draw a DNA double helix with a RNA polymerase bubble attached. Label it #1 |
| 5 | RNA polymerase unzips the DNA strand | Inside the nucleus, draw a DNA double helix with middle section “opened up” . Label it #2 |
| 6 | Ribosome reads the mRNA strand as codons (3 bases at a time) | Break up your mRNA strand into 3s. |
| 7 | the newly created mRNA strand detaches from the DNA strand and leaves the nucleus, DNA strand winds back up | Write your mRNA leaving the nucleus. Label it #4 |
| 8 | amino acids link up to create a protein | Draw a chain of amino acids (the protein) being made by the ribosome. Make it look like it is coming out of the ribosome. Use the 3 amino acids coded from your mRNA strand. Label is #7 |
| 9 | RNA polymerase adds complimentary nucleotides to one side of the DNA strand | Write this one strand of DNA: TACAATAGCATC by your “opened up” DNA double helix. Write in the complimentary RNA nucleotides with a different colored pen/pencil. Label #3. |
| 10 | the newly created mRNA strand detaches from the DNA strand and leaves the nucleus, DNA strand winds back up | Write your mRNA leaving the nucleus. Label it #4 |
| 11 | RNA polymerase unzips the DNA strand | Inside the nucleus, draw a DNA double helix with middle section “opened up” . Label it #2 |
| 12 | RNA polymerase attaches to the DNA strand | Inside the nucleus, draw a DNA double helix with a RNA polymerase bubble attached. Label it #1 |

## Protein Synthesis Game Board

Eukaryotic Cell

Protein Synthesis Game Name:

## \*Play the game and answer the questions below….

## Game Analysis Questions

1. Why can’t the cell directly take the code from DNA to make a protein? Why is RNA necessary?
2. In what two cell organelles does protein synthesis take place? Name the process that takes place at each.
3. List the 2 types of RNA molecules found in protein synthesis **AND** what they do.
4. Compare and Contrast DNA replication and Protein Synthesis

